Application of: Robert C. Oswald	Date: 28 April 2004
Serial Number: 09/734,301	Group Art Unit: 3679
Filed: 12 December 2000	Examiner: F. Saether
Title: *"Drive Pin for Fastening to a Sheet-Metal Framing Member" (as Amended)*	Atty. Docket No.: 2275-010

Assistant Commissioner for Patents
Washington, D.C. 20231

APPELLANT'S BRIEF

Dear Sir:

This Brief is filed pursuant to a Notice of Appeal mailed on 6 April 2004 in the matter of the above-identified application.

(1) Real Party in Interest

HKN Associates, LLC, doing business as Aerosmith Fastening Systems, is the real party in interest and the assignee of this application.

(2) Related Appeals and Interferences

Appellant is aware of no related application that will directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal.

(3) Status of Claims

Claims 1 through 20 are on appeal. Appendix A provides a clean copy of the claims on appeal. Appendix B provides a clean copy of the Figures.

Claims 1 through 20 are rejected under 35 U.S.C. 103(a) as obvious over Dove et al., U.S. Patent No. 3,977,142 (hereinafter Dove) in view of Ditka et al., U.S. Patent No. 5,867,958 (hereinafter Ditka), in view of Rosenberg, U.S. Patent No. 1,485,202 (hereinafter Rosenberg), and in view of Hoepker et al., U.S. Patent No. 5,261,770 (hereinafter Hoepker).

APPENDIX C provides clean copies of the Dove, Ditka, Rosenberg, and Hoepker references.

(4) Status of Amendments

No amendments have been filed subsequent to final rejection.

(5) Summary of Invention

For the Board's convenience, Appendix A provides a clean copy of all the claims on appeal, of which claims 1, 13, and 20 are independent claims. Appendix B provides clean copies of FIGs. 1 through 7, as referred to hereinafter.

Independent claims 1, 13, and 20 each claim a drive pin (20) for the fastening of a material (22) to a sheet-metal framing member (24) with an automatic nailer (not shown). This is as depicted in FIGs. 1 and 5-7, and as discussed in the specification in the paragraphs beginning on page 8, line 19, and page 9, line 1.

Independent claims 1, 13, and 20 each claim that drive pin (20) has a cylindrical shank (28) having a head (26) on one end and an ogival-shaped or ballistic tip (40) on the other end, wherein the ogival-shaped tip (40) is configured to penetrate the material (22) and the sheet-metal framing member (24) under force of the automatic nailer. This is as depicted in FIGs. 1, 2, and 5-7, and as discussed in the specification in the paragraph beginning on page 9, line 11.

The use of an ogival-shaped tip (40) is not arbitrary. By having an ogival-shaped (i.e., ballistic or bullet-shaped) tip (40), the drive pin (20) is able to penetrate the sheet-metal framing member (24) with minimal tearing and deformation thereof.

Independent claims 1 and 13 each claim a knurl (42) having a plurality of substantially parallel spiral grooves (32) rolled

upon the cylindrical shank (28), wherein each groove (32) subtends an angle (54) of at least 15° relative to an axis (46) of the cylindrical shank (28). Independent claim 13 goes on to claim that the angle (54) is not greater than 30° relative to the axis (46). Independent claim 20 refines the angle (54) to be 26° ± 2° relative to the axis (46). This is as depicted in FIG. 1, and as discussed in the specification in the paragraph beginning on page 9, line 32, page 10, line 5, and page 10, line 20.

The angle (54) is not arbitrary. In dealing with a sheet-metal framing member (24) of the intended thickness (38), i.e., between 25 and 12 gauge, and most preferably 18 gauge (see paragraph beginning on page 8, line 29), it has been found that an angle (54) of less than 15° produce a weak bond between the sheet-metal framing member (24) and the material (22) fastened to it. Conversely, if the angle (54) is greater than 30°, there will be excessive tearing around the hole penetrating the sheet-metal framing member (24). This excessive tearing again results in a weak bond between the sheet-metal framing member (24) and the material (22) fastened to it. When the sheet-metal framing member (24) is of the most desired thickness (38), i.e., is formed of 18-gauge sheet metal, then the optimal value of the angle (54) is 26° ± 2°.

(6) Issues

The following issues are presented for review:

1. Whether claims 1 through 20 are unpatentable under 35 U.S.C. 103(a) over Dove (US 3,977,142) in view of Ditka (US 5,867,958), Rosenberg (US 1,485,202), and Hoepker (US 5,261,770).

(7) Grouping of Claims

Group 1, Claims 1 and 4 through 12

It is appellant's position that claims 1 and 4 through 12 stand or fall together and are separately patentable from all other claims on appeal.

Group 2, Claims 2, 3, and 13 through 20

It is appellant's position that claims 2, 3, and 13 through 20 stand or fall together and are separately patentable from all other claims on appeal.

(8) Argument

Group 1, Claims 1 and 4 through 12

In Group 1, claim 1 is an independent claim and claims 4 through 12 depend, either directly or indirectly from independent claim 1.

A Final Office Action dated 14 January 2004 rejected claims 1 through 12 under 35 U.S.C. 103(a) as being unpatentable over Dove in view of Ditka, Rosenberg, and Hoepker.

The Final Office Action asserts that Dove discloses a drive pin in the environment as defined in the claims (i.e., a sheet-metal fastener), including spiral grooves having a minor diameter smaller than a base diameter, but does not disclose the angle of the spiral grooves as claimed. The Final Office Action goes on to assert that Ditka discloses a drive pin intended for use in a different environment (i.e., a masonry fastener), which drive pin includes spiral grooves having an angle including the angle claimed in the claims. The Final Office Action then asserts that Rosenberg is a linking reference teaching the use of spiral grooves in both environments, thereby allowing a person of ordinary skill in the art to associate the spiral groove of Ditka with those of Dove. Finally, the Final Office Action asserts that, while neither Dove, Ditka, nor Rosenberg teach an ogival-shaped tip, Hoepker teaches a dive pin having such a tip, and it would have been obvious to one of ordinary skill in the art to replace the tip of Dove with that of Hoepker in order to facilitate automated hammering of the fastener, wherein automated hammering is a more efficient method of

affixing the fastener, and wherein the ogival-shaped tip facilitates automated hammering.

Independent claim 1 claims a drive pin having a cylindrical shank, a spiral groove of at least 15° upon a portion of the cylindrical shank, and an ogival-shaped tip.

Dove, Ditka, and Rosenberg all teach relatively simple, one-piece fasteners or drive pins. It is only Dove, however, that addresses a problem similar to the problem addressed by the present invention, namely the use of a drive pine to fasten a material to sheet metal. Ditka and Rosenberg both teach fasteners for fastening material to concrete or masonry.

There are two dissimilar arts under evaluation here. The present invention, Dove, and Hoepker teach in the art of fastening a material to sheet metal. Conversely, Ditka and Rosenberg teach in the art of fastening a material to concrete or other masonry. The two arts are radically different in nature.

In the art of fastening a material to sheet metal, the practitioner must deal with a material (sheet metal) that is malleable (i.e., readily deformed), readily torn, and has a low coefficient of friction. These properties present a set of unique difficulties. Of these difficulties, the most critical is perhaps a fastening medium and methodology that will achieve a strong bond between the sheet metal and the material fastened to it. For example, if the fastening medium is smooth, the low coefficient of friction of the sheet metal results in a weak bond. Conversely, it the fastening medium is too rough (e.g., a

screw forced straight in, like a nail), the deformation and tearing of the sheet metal again results in a weak bond.

In the art of fastening a material to masonry, on the other hand, the practitioner must deal with materials (concrete, brick, porous tile, sandstone, rock, etc.) that are inflexible and indeformable, frangible, crumble rather than tear, and have high coefficients of friction. These properties present a set of unique difficulties radically different from those of the art of fastening to sheet metal. In the art of fastening to masonry, the practitioner strives to develop a medium and methodology that will minimize cracking and crumbling of the surrounding masonry while achieving the desired strength of bond.

Dove teaches a fastener having a cylindrical shank, a spiral groove of 35° to 55° (column 2, line 61) upon a portion of the cylindrical shank, and a conical tip. Alone, Dove does not teach what is claimed by appellant's independent claim 1.

Hoepker does indeed teach a fastener having an ogival-shaped tip. To combine the tip of Hoepker with the fastener of Dove, however, would introduce an ogival tip onto the Dove fastener. Dove expressly and specifically teaches away from the use of an ogival-shaped tip (column 7, lines 12-36):

> With regard to the abrupt, angled transition between the conical piercing point and the smooth cylindrical shank portion immediately adjacent the piercing point, there is at least one specific advantage which this construction attains. By having the actual entering point widened out conically to its maximum diameter at a location fairly close to the conical point itself, all of the "cold working" of the underlying metal joist layer as

> it is being pierced will take place very early in the movement of the fastener. ...The special advantage of this construction is best understood when compared to an alternative construction not within the ambit of this invention, namely a bullet-shaped [ogival-shaped] piercing point and nose portion. If a bullet-shaped piercing point were given the same apex cone angle as that illustrated, described and claimed in this disclosure, the portion of the fastener between the piercing point and the threaded portion which is taken up by the gradual increase of the pierced hole to the maximum diameter would have to be greater than that of the construction disclosed herein.

To impose the ogival-shaped tip of Hoepker upon Dove is to go directly contrary to the teaching of Dove. This is not allowed. In re Gordon et al., 221 USPQ 1125 (Fed. Cir. 1984) states:

> Question is not whether patentable distinction is created by viewing prior art apparatus from one direction and claimed apparatus from another, but whether it would have been obvious from fair reading of prior art reference as whole to turn prior art apparatus upside down; mere fact that prior art apparatus could be modified by turning apparatus upside down does not make modification obvious unless prior art suggested desirability of modification.

That is, just because Dove can be modified by use of the ogival-shaped tip of Hoepker does not make it obvious to do so unless Dove suggests in some form that such a modification may be made. To the contrary, Dove expressly and specifically addresses and rejects the use of an ogival-shaped tip.

Therefore, it would not be obvious to one of ordinary skill in the art of fastening to sheet metal to combine the ogival-shaped tip of Hoepker with the fastener of Dove, as this would render Dove unable to fulfil Dove's intended purposes.

Ditka teaches a fastener having a cylindrical shank, a spiral groove of 0° to 45° upon a portion of the cylindrical shank, and a pointed tip. The fastener of Ditka is intended for use in a pre-drilled hole in concrete, so the shape of the tip is irrelevant. A pointed tip, shown as a pyramidal tip in the Figures, allows easy insertion into the predrilled hole.

To combine Ditka with Dove on the basis of Ditka not having a conical tip is, for the argument discussed hereinbefore in connection with Hoepker and Dove, also improper. Dove expressly and specifically teaches the use of a conical point to minimize tearing of the hole formed in the sheet metal during penetration. One skilled in the art of fastening to sheet metal is well aware that the use of a pyramidal tip over a conical tip would exacerbate, not ameliorate, the tearing of the hole during penetration. It would not be obvious, therefore, to one of ordinary skill in the art of fastening to sheet metal to modify the drive pin of Dove with the tip of Ditka, as this would render Dove unworkable for Dove's intended purposes.

The spiral grooves of Ditka have an angle between 0° and 45°. This angle does, as asserted by the Final Office Action, encompass the claimed groove angle of "at least 15°." Dove, however, expressly states (column 9, lines 11-15):

> While a thread angle of 45° has been referred to in this specification as providing satisfactory results, it is considered that thread angles in the general range from about 35° to about 55° may be utilized without altering the basic characteristics or grip strength of the fastener.

To combine the groove angle of Ditka with Dove would only be obvious if the minimum angle of Ditka were 35°, not 0°. In re Wesslaw, 147 USPQ 391 (CCPA 1965) states :

> The ever present question in cases within the ambit of 35 U.S.C. 103 is whether the subject matter as a whole would have been obvious to one of ordinary skill in the art following the teachings of the prior art at the time the invention was made. It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The Anderson patent is the only reference before us which recognizes the desirability of producing polyethylene with a narrow molecular weight distribution range. Were one to follow the teachings of that patent in its entirety, he would be led to believe that control over the molecular weight distribution of polyethylene was gained independently of the catalyst system, a belief untenable in light of appellant's disclosure.

To assert, therefore, that the 0° to 45° angular range of the Ditka grooves may override or modify the 35° to 55° angular range of the Dove grooves is to deny the teachings of Dove away from angles of 0° to 35°. Both Dove and the present invention would fail to perform adequately if the spiral angle were less that the minimum spiral angle, i.e., 15° for the present invention and 35° for Dove. It is not obvious, therefore, for one of ordinary skill in the art of fastening to sheet metal to modify the angular values of Dove to those of Ditka, as this would render Dove unfit to fulfill Dove's functions.

Furthermore, since Dove expressly and specifically teaches away from the use of angles below 35°, it would be illogical to

combine Ditka with Dove in order to encompass the appellant's claim of an angle greater than 15°, as this would presume a teaching of Dove for angles between 15° and 35°, which angles Dove expressly and specifically disallows.

The fastener of Ditka is intended to fasten a material to concrete, i.e., to masonry. As discussed hereinbefore, the art of fastening to masonry is markedly different from the art of fastening to sheet metal. One skilled in the art of fastening to sheet metal would not be inspired to look to the art of fastening to masonry. It is therefore not obvious that a person skilled in the art of fastening to sheet metal would combine Ditka with Dove.

This difference in arts is recognized by the Final Office Action, which itself asserts that Rosenberg is a linking reference teaching the use of the same fastener in both arts. However, the Final Office Action's assertion that Rosenberg is a linking reference is false. Rosenberg states (page 1, lines 12-21):

> This invention relates to improvements in nails and like anchoring means, and has as its object the provision of easily and quickly operated means for effecting a permanent anchorage or connection to a wall of masonry, such as brick, concrete, porous tile, sand-stone [sic], and like substances characterized by lack of elasticity or capacity for free expansion, and susceptible of being crumbled.

The above description of the material to which the fastener is to be anchored cannot be sheet metal. Rosenberg teaches a fastener for fastening a material to masonry, and cannot be construed as a linking reference.

Hoepker teaches a fastener having a conical shank, a knurled surface upon a portion of the conical shank, a first conical disk upon a leading (smaller-diameter) end of the shank, a second conical disk upon a trailing (larger-diameter) end of the shank, and an ogival-shaped tip. The fastener of Hoepker uses a wedging action between the two conical disks and between the disks and the knurled portion of the shank to affix two pieces of sheet metal to each other. Thus Hoepker is not a relatively simple, one-piece fastener.

The fastening methodology of Hoepker depends upon the conical shape of the shank and the presence of the two conical disks. This methodology is radically different from the fastening methodology of the present invention as recited in claims 1 and 4 through 12. This methodology is also radically different from the fastening methodologies of Dove, Ditka, or Rosenberg. Dove teaches a simple, one-piece fastener. To impose the methodological limitations of the multi-part fastener of Hoepker upon the simple, one-piece fastener of Dove would require complicating Dove beyond the simple, one-piece fastener taught, and would render Dove unnecessarily complicated and costly. The complications so introduced would render Dove incapable of easily and efficiently fulfilling its primary function, i.e., of manually fastening flooring material to sheet-metal joists. It would therefore not be obvious to one of ordinary skill in the art to combine Hoepker with Dove.

In general, appellant believes that none of the cited references teaches or suggests that which appellant has claimed in independent claim 1. As stated in W.L. Gore & Associates,

Inc. V. Garlock, Inc., 220 USPQ 303, 312-313 (Fed. Cir. 1983) cert. denied 469 U.S. 851 (1984):

> To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record covey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.

Evidence of hindsight may be seen in that the Final Office Action has ignored the express and specific teachings of Dove, as discussed hereinbefore, away from the use of an ogival-shaped tip, and away from the use of groove angles below 35°. Further evidence of hindsight may be found in the Final Office Action's erroneous assertion that Rosenberg teaches a linking reference between the arts of fastening to sheet metal and fastening to concrete in direct contravention of the language of Rosenberg. Also, a strong suggestion of hindsight may be seen in that the Final Office Action uses four distinct references to counter the simple device claimed in claim 1.

Indeed, it is appellant's application, and not the prior art, which teaches of a sheet-metal fastener having both a cylindrical shank having spiral grooves and an ogival-shaped tip. Moreover, a combination of the Dove reference with either the Ditka or Hoepker references, with or without arguable linking by the Rosenberg reference, cannot cause Dove to teach that which neither Dove, Ditka, nor Hoepker teach. Furthermore, the Final Office Action has provided no line of reasoning to indicate why one skilled in the art of fastening to sheet metal would be motivated to look to the art of fastening to masonry to

make the changes required of Dove to cause Dove to more closely resemble appellant's claimed invention. Rather, it is only appellant's specification that teaches doing that which appellant claims.

For the several reasons discussed hereinbefore, appellant believes independent claim 1 is allowable. Furthermore, claims 2 through 12, being directly of indirectly dependent from independent claim 1, are themselves allowable by reason of that dependency.

Group 2, Claims 2, 3, and 13 through 20

In Group 2, claims 2 and 3 depend, either directly or indirectly, from independent claim 1 discussed hereinbefore in conjunction with the Group 1 claims. Also in Group 2, claim 13 is an independent claim and claims 14 through 19 depend, either directly or indirectly from independent claim 13. Claim 20 is another independent claim.

The Final Office Action rejected claims 2, 3, and 13 through 20 under 35 U.S.C. 103(a) as being unpatentable over Dove in view of Ditka, Rosenberg, and Hoepker.

As for the Group 1 claims, the Final Office Action asserts that Dove discloses a drive pin in the art of fastening to sheet metal, including spiral grooves having a minor diameter smaller than a base diameter, but does not disclose the angle of the spiral grooves as claimed. The Final Office Action goes on to assert that Ditka discloses a drive pin in the art of fastening to masonry, which drive pin includes spiral grooves having an

angle including the angle claimed in the claims. The Final Office Action then asserts that Rosenberg is a linking reference teaching the use of spiral grooves in both arts, thereby allowing a person of ordinary skill in the art to associate the spiral groove of Ditka with those of Dove. Finally, the Final Office Action asserts that Hoepker teaches a dive pin having a ogival shaped tip, and it would have been obvious to one of ordinary skill in the art of fastening to sheet metal to replace the tip of Dove with that of Hoepker.

In the Group 1 claims discussed hereinbefore, each spiral groove upon the cylindrical shank subtends an angle of at least 15° relative to an axis of the cylindrical shank. In the Group 2 claims, the angle is further claimed as being not greater than 30°. In claims 3, 14, and 20, this angle is refined to the more desired angle of 26° ± 2°.

The arguments presented for Group 1 claims 1 and 4 through 12 apply equally to Group 2 claims 2, 3, and 13 through 20. In addition, the following arguments also apply.

Independent claim 13 and dependent claim 2 claim a drive pin having a cylindrical shank, a spiral groove of between 15° and 30° upon a portion of the cylindrical shank, and an ogival-shaped tip.

Dove teaches a fastener having a cylindrical shank with a spiral groove of 35° to 55° formed thereupon. Ditka teaches a fastener having a cylindrical shank having a spiral groove of 0° to 45° formed thereupon. Dove teaches away from combining the groove angle of Ditka into Dove because Dove expressly teaches a

minimum angle of 35°. In re Wesslaw (*supra*) makes it clear that to assert that the 0° to 45° angular range of the Ditka grooves may override or modify the 35° to 55° angular range of the Dove grooves is improper because this combination denies the explicit and specific teachings of Dove about using angles of 35° to 55°. As stated in Dove, the basic characteristics or grip strength of the fastener will be altered if a different range of angles is used (column 9, lines 11-15). Thus, such a combination will cause Dove to fail to perform as intended. It is not obvious, therefore, for one of ordinary skill in the art of fastening to sheet metal to modify the angular values of Dove to those of Ditka, as this would render Dove unfit to fulfill Dove's functions.

Independent claim 20 and dependent claims 3 and 14 refine the 15° to 30° range of the groove angle of independent claim 13 and dependent claim 2 to a range of 26° ± 2° (i.e., 24° to 28°). The above argument for independent claim 13 and dependent claim 2 also hold for independent claim 20 and dependent claim 3 with appropriate refinements of the angular values involved. The recited range of 26° ± 2° is far outside the range taught by Dove. Ditka teaches a range of 0° - 45°, but Ditka teaches a masonry fastener. And, Dove teaches away from using a different angular range because a different range would alter basic characteristics and grip strength.

For these reasons, and for the reasons discussed hereinbefore in conjunction with the Group 1 claims, appellant believes it would not be obvious to combine Dove with either Ditka or Hoepker, and that Rosenberg is not a linking reference between the arts of fastening to sheet metal and fastening to masonry.

In general, appellant believes that none of the cited references teaches or suggests that which appellant has claimed in independent claims 13 and 20 without hindsight. As discussed hereinbefore, evidence of hindsight may be seen in that the Final Office Action has ignored the express and specific teachings of Dove away from the use of an ogival-shaped tip, away from the use of groove angles below 35°, in the erroneous assertion that Rosenberg teaches a linking reference between the arts of fastening to sheet metal and fastening to concrete in direct contravention of the language of Rosenberg, and in the large number of references combined.

Indeed, it is again appellant's application, and not the prior art, which teaches of a sheet-metal fastener having both a cylindrical shank having spiral grooves and an ogival-shaped tip. Moreover, a combination of the Dove reference with either the Ditka or Hoepker references, with or without arguable linking by the Rosenberg reference, cannot cause Dove to teach that which neither Dove, Ditka, nor Hoepker teach. Furthermore, the Final Office Action has provided no line of reasoning to indicate why one skilled in the art of fastening to sheet metal would be motivated to look to the art of fastening to masonry to make the changes required of Dove to cause Dove to more closely resemble appellant's claimed invention. Rather, it is only appellant's specification that teaches doing that which appellant claims.

For the several reasons discussed hereinbefore, appellant believes independent claims 13 and 20 are allowable, as are dependent claims 2 and 3 which depend from independent claim 1.

Furthermore, claims 14 through 19, being directly of indirectly dependent from independent claim 13, are themselves allowable by reason of that dependency.

Conclusion

Claims 1 through 20 are included in this appeal. The rejection of claims 1 through 20 under 35 U.S.C. 103(a) as obvious over Dove in view of Ditka, Rosenberg, and Hoepker is believed to be improper. Neither Dove, nor Dove in any combination with Ditka, Rosenberg, and/or Hoepker expressly teach of a drive pin sheet-metal-fastener combination having a cylindrical shank, a spiral groove angle greater than 15° formed upon a portion of the cylindrical shank, and an ogival-shaped tip.

Appellant believes that the arguments above fully respond to every outstanding ground of rejection and that the contested claims should be found allowable.

Respectfully submitted,

Lowell W. Gresham
Attorney for Applicants
Reg. No. 31,165

Lowell W. Gresham
Meschkow & Gresham, P.L.C.
5727 North Seventh Street
Suite 409
Phoenix, AZ 85014
(602) 274-6996

(9) Appendix A -- Claims on Appeal

This Appendix is eight (8) pages, including this cover page, and contains a clean, double-spaced copy of all the claims on appeal.

1. A drive pin for the fastening of a material to a sheet-metal framing member with an automatic nailer, said drive pin comprising:

a substantially cylindrical shank, a first portion of which has a base diameter;

a head coupled to said shank;

a knurl rolled upon a second portion of said shank, said knurl having a plurality of substantially parallel spiral grooves, wherein said spiral grooves have a minor diameter less than said base diameter, and wherein each of said spiral grooves subtends an angle of at least 15 degrees relative to an axis of said shank; and

an ogival-shaped tip coupled to said first portion of said shank and configured to penetrate said material and said sheet-metal framing member under force of said automatic nailer.

2. A drive pin as claimed in claim 1 wherein said spiral-groove angle is no greater than 30 degrees relative to said shank axis.

3. A drive pin as claimed in claim 2 wherein said spiral groove angle is substantially 26 ± 2 degrees relative to said shank axis.

4. A drive pin as claimed in claim 1 wherein:

adjacent ones of said spiral grooves are separated by spiral ridges;

each of said spiral grooves and ridges has a substantially equal length; and

each of said spiral ridges is substantially unbroken throughout said length.

5. A drive pin as claimed in claim 4 wherein:

said base diameter has a range of 0.0625 to 0.125 inch; and

said spiral ridges have a major diameter greater than said base diameter.

6. A drive pin as claimed in claim 5 wherein:

said base diameter is 0.098 ± 0.003 inch;

said minor diameter is 0.084 ± 0.003 inch; and

said major diameter is 0.112 ± 0.003 inch.

7. A drive pin as claimed in claim 5 wherein:

said base diameter is 0.110 ± 0.003 inch;

said minor diameter is 0.096 ± 0.003 inch; and

said major diameter is 0.124 ± 0.003 inch.

8. A drive pin as claimed in claim 5 wherein:

said spiral grooves and ridges together form a plurality of threads; and

each of said threads is rolled full upon said shank.

9. A drive pin as claimed in claim 1 wherein, when said material is sheet metal, said knurl is rolled tight to said head.

10. A drive pin as claimed in claim 1 wherein, when said material is gypsum sheathing, said head is a cupped bugle head.

11. A drive pin as claimed in claim 1 wherein:

said knurl has at least seven of said spiral grooves; and

each of said spiral grooves has an independent start.

12. A drive pin as claimed in claim 11 wherein said knurl has no more than fourteen of said spiral grooves.

13. A construction assembly effected by an automatic nailer, said construction assembly comprising:

a sheet-metal framing member;

a material attached to said sheet-metal framing member; and

a drive pin attaching said material to said sheet-metal framing member, said drive pin comprising:

a substantially cylindrical shank;

a head coupled to said shank;

a knurl formed of a plurality of threads rolled full upon said shank to produce a plurality of substantially parallel spiral grooves, wherein each of said spiral grooves subtends an angle of no less than 15 and no greater than 30 degrees relative to an axis of said shank; and

an ogival-shaped tip coupled to said shank and configured to penetrate said material and said sheet-metal framing member under force of said automatic nailer.

14. A construction assembly as claimed in claim 13 wherein said spiral-groove angle is substantially 26 ± 2 degrees relative to said shank axis.

15. A construction assembly as claimed in claim 13 wherein said sheet-steel framing member has a thickness of 0.0179 to 0.0966 inch.

16. A construction assembly as claimed in claim 15 wherein said sheet-steel framing member has a thickness of no more than 0.0428 inch.

17. A construction assembly as claimed in claim 13 wherein:

said material is a sheet metal; and

said knurl is rolled tight under said head.

18. A construction assembly as claimed in claim 13 wherein:

said material is gypsum sheathing; and

said head is a cupped bugle head.

19. A construction assembly as claimed in claim 13 wherein:

said knurl has at least seven and no more than fourteen of said spiral grooves;

adjacent ones of said spiral grooves are separated by spiral ridges;

each of said spiral grooves and ridges has a substantially equal length; and

each of said spiral ridges is substantially unbroken throughout said length.

20. A drive pin for the fastening of a material to a sheet-metal framing member with an automatic nailer, said drive pin comprising:

a substantially cylindrical shank having a base diameter in a range of 0.0625 to 0.125 inch;

a head coupled to a first end of said shank;

a knurl formed of at least seven and no more than fourteen substantially parallel spiral grooves having a minor diameter less than said base diameter, wherein adjacent ones of said spiral grooves are separated by substantially unbroken spiral ridges having a major diameter greater than said base diameter, and wherein said spiral grooves and ridges together form a plurality of threads rolled full upon a portion of said shank at an angle of substantially 26 ± 2 degrees relative to an axis of said shank;

an ogival-shaped tip coupled to a second end of said shank and configured to penetrate said material and said framing member under force of said automatic nailer.

Appendix B -- Figures

This Appendix is two (2) pages, including this cover page, and contains one (1) drawing sheet containing a clean copy of each of the Figures 1 through 7.

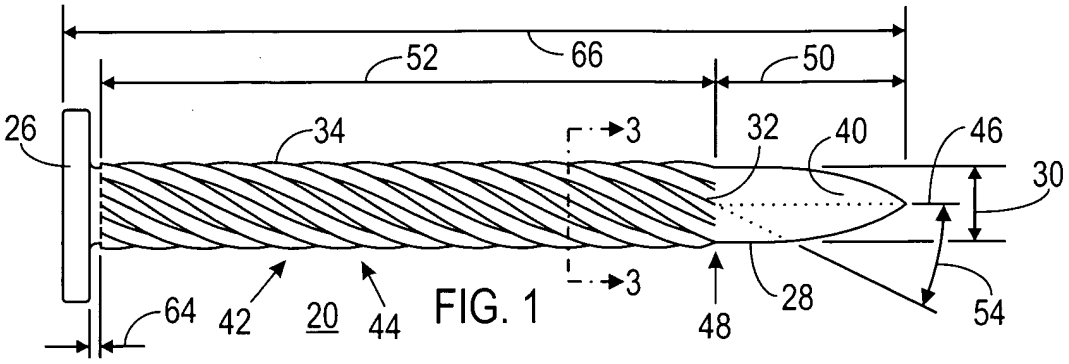

FIG. 1

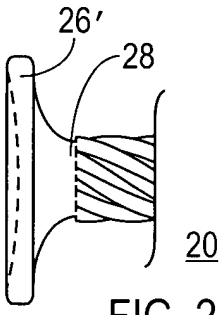

FIG. 2

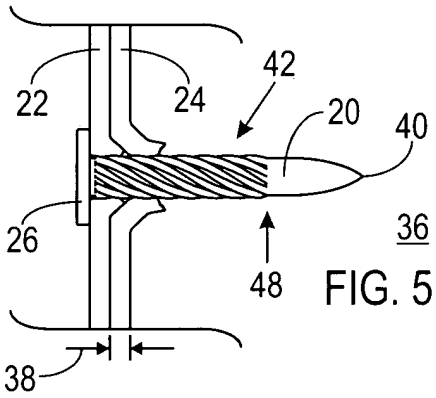

FIG. 5

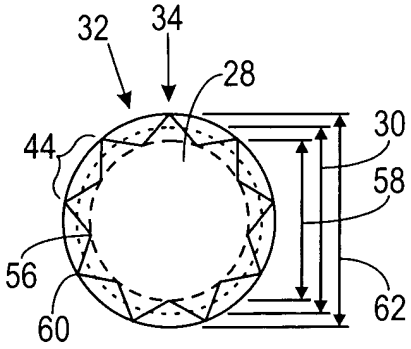

FIG. 3

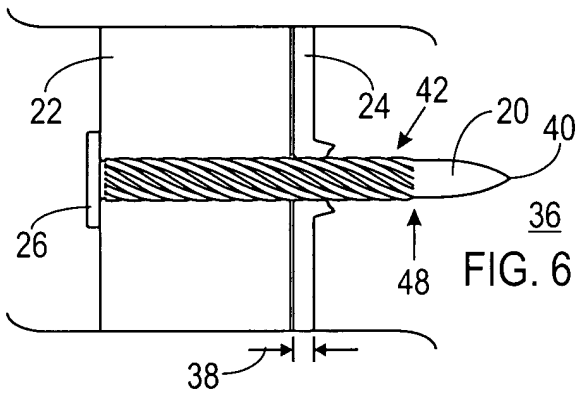

FIG. 6

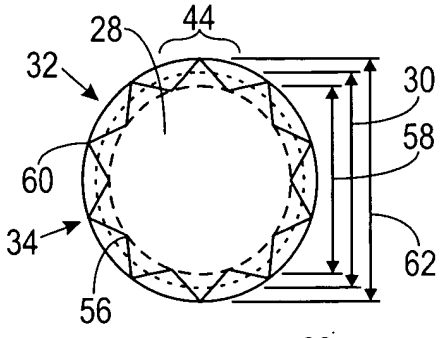

FIG. 4

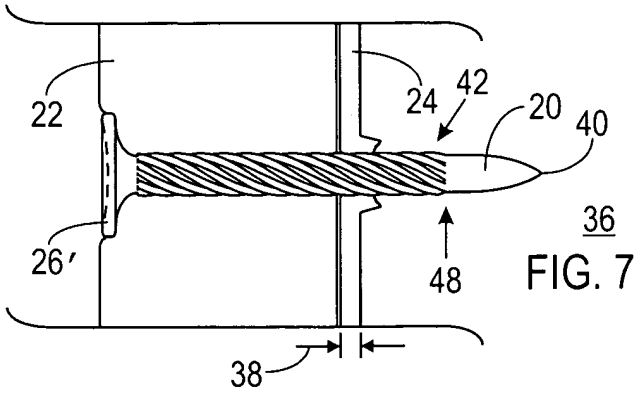

FIG. 7

Appendix C -- Prior Art

This Appendix is thirty (30) pages, including this cover page, and contains clean copies of the prior art under consideration listed below:

1. Dove et al., U.S. Patent No. 3,977,142, seven (7) pages;
2. Ditka et al., U.S. Patent No. 5,867,958, fourteen (14) pages;
3. Rosenberg, U.S. Patent No. 1,485,202, four (4) pages; and
4. Hoepker et al., U.S. Patent No. 5,261,770, four (4) pages.